NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

Office of Public Information

July 1, 1960

INTERNATIONAL
SATELLITE AND SPACE PROBE SUMMARY

The following space vehicles are in orbit as of this date:

NAME/COUNTRY	LAUNCH DATE	TRANSMITTING
Explorer I (US)	Jan. 31, 1958	No
Vanguard I (US)	March 17, 1958	Yes
*Lunik I (USSR)	Jan 2, 1959	No
Vanguard II (US)	Feb. 17, 1959	No
*Pioneer IV (US)	March 3, 1959	No
Explorer VI (US)	August 7, 1959	No
Vanguard III (US)	Sept. 18, 1959	No
Explorer VII (US)	Oct. 13, 1959	Yes
*Pioneer V (US)	March 11, 1960	Yes
Tiros I (US)	April 1, 1960	Yes
Transit I-B (US)	April 13, 1960	Yes
Spacecraft (USSR)	May 15, 1960	Yes
Midas II (US)	May 24, 1960	Yes
Transit II-A (US)	June 22, 1960	Yes
NRL Satellite (US)	June 22, 1960	Yes

*In solar orbit; others in earth orbit

CURRENT SUMMARY (July 1, 1960)

Earth Orbit: US - 11
USSR - 1

Solar Orbit: US - 2
USSR - 1

Transmitting: US - 8
USSR - 1

COMPLETE SUMMARY (Launched to date)

Earth Orbit: US - 21
USSR - 5

Solar Orbit: US - 2
USSR - 1

Lunar Impact: USSR - 1

Project: Transit II-A (1960 Eta)

Project Direction: U. S. Navy

Launched: June 22, 1960, 1:54 a.m.(EDT)

From: Atlantic Missile Range

Lifetime: Both est. 50 yrs. (Transmitting lifetimes: up to one year.)

Major Objectives Demonstrate feasibility of all-weather global navigational satellites for ships and aircraft; increase accuracy of geodetic measurements; provide accurate time standards.

Major Results: Two satellites (see "a" and "b" payloads below) put in orbit. Both transmitting clearly. Data being analyzed.

S-60-10

Flight Program

Launch Vehicle: Thor-Able-Star. Stages: (1) Modified USAF Thor IRBM; (2) USAF Able-Star liquid engine with re-start capability.

Lift-Off Weight: Over 105,000 lbs.

Dimensions: 79.3 ft. high; 8 ft. base diameter

Program: Place satellites in near-circular, high altitude Earth orbit.

Program Results: Orbits achieved.

* **Perigee (Miles):** (a) 389; (b) 382
Apogee (Miles): (a) 665; (b) 657

Inclination: (a) 66.7°; (b) 66.8° to Eq.
Period: (a) 101.7; (b) 101.6 minutes

Velocity: (a) Not available
(b) 17,146 mph at perigee; 16,125 mph at apogee

Payload And Instrumentation

Dimensions: (a) 36 in. diameter
(b) 20 in. diameter

Payload Weights: (a) 223 lbs.
(b) 42 lbs.

Payload Configuration: (a) Sphere ringed by solar panels.
(b) Sphere ringed by "solar patches". Originally attached to (a) by metal band.

Instrumentation: (a) Two ultra-stable oscillators; infrared scanner to measure satellite's rotation; electronic clock as time standard; Canadian receiver to measure galactic noise. (b) instruments to measure solar radiation.

Transmitters: Five: (a) 54, 324, 162, 216 and (b) 108 MC

Power Supply: Completely solar powered; nickel-cadmium battery for power storage.

TRANSIT II-A

Additional Data: * (a) figures for June 26, 1960; (b) figures for June 22, 1960

First time two satellites successfully launched at once.
Each orbiting and transmitting separately.

Sources: U. S. Navy

Date: Prepared July 1, 1960

Project: Transit I-B (1960 Gamma)

Project Direction: U. S. Navy

Launched: 7:03 AM EST, April 13, 1960

From: Atlantic Missile Range

Lifetime: Est. 16 mos.

Major Objectives: Determine feasibility and equipment for future all weather global navigational satellites for ships and aircraft.

Major Results: Orbit achieved. Results indicate such a navigational system is feasible.

S-60-6A

Flight Program

Launch Vehicle: Thor-Able-Star. Stages: (1) Modified USAF Thor IRBM; (2) USAF Able-Star liquid engine with re-start capability. Attitude control used during coasting flight.

Lift-Off Weight: Over 105,000 lbs.

Dimensions: Over 79 ft. high, 8 ft. base diameter.

Program: Place satellite into Earth orbit.

Program Results: Orbit achieved.

Perigee (Miles): 233

Apogee (Miles): 479

Inclination: 51° to Equator

Period: 96 minutes

Velocity: 16,590 mph (injection velocity)

Payload And Instrumentation

Dimensions: 36 in. diameter

Payload Weights: 265 lbs. total

Payload Configuration: Sphere ringed by banks of solar cells. Glass fibre shell.

Instrumentation: Two ultra-stable oscillators in temperature-resistant Dewar flasks. Infrared scanner measures rotation. Two receivers. Two telemetering receivers and transmitters.

Transmitters: Four: 54 MC; 162 MC; 216 MC; 324 MC. Estimated life: three months for solar cells, one month for chemical batteries.

Power Supply: Chemical batteries charged by solar cells.

TRANSIT I-B

Additional Data:

Sources: U. S. Navy

Date: Prepared July 1, 1960

Prepared by Office of Public Information, U.S. National Aeronautics and Space Administration, Washington 25, D.C.

Project: Tiros I (1960 Beta)

Project Direction: NASA

Launched: 6:40 a.m. EST, April 1, 1960

From: Atlantic Missile Range

Lifetime: Est. 50-100 yrs. in orbit. (Useful lifetime: 78 days.)

Major Objectives Test of experimental television techniques leading to eventual worldwide meteorological information system.

Major Results: Successful launch into near-circular orbit; video system relayed over 22,000 pictures containing cloud-cover photographs of meteorological interest.

S-60-5A

Flight Program

Launch Vehicle: Thor-Able. Stages: (1) Modified USAF Thor IRBM; (2) Liquid engine modified from Vanguard; (3) Solid motor modified from Vanguard.

Lift-Off Weight: 150,000 lbs. (Approx.)

Dimensions: 90 ft. high; 8 ft. base diameter

Program: Place satellite into circular orbit; photograph cloud cover over many areas of the world.

Program Results: Successful. Programmed goals attained.

Perigee (Miles): 429.7 (June 23, 1960)
Apogee (Miles): 467.4 (June 23, 1960)

Inclination: 48.3° to Equator
Period: 99.2 minutes

Velocity: 16,809 mph at third-stage burnout.

Payload And Instrumentation

Dimensions: 19 in. high; 42 in. diameter **Payload Weights:** 270 lbs. total

Payload Configuration: "Pillbox" shape covered on top and sides by 9,200 solar cells. Two pair of spin rockets and transmitter antenna surround base-plate. Receiving antenna on top center. Aluminum/stainless steel shell.

Instrumentation: One wide and one narrow angle camera, each with tape recorder for remote operation. Picture data stored on tape or transmitted directly to ground command stations.

Transmitters: Picture data transmitted by two 2-watt FM at 235 MC; two* tracking beacons operated on 108 and 108.03 MC with 30 mw output.

Power Supply: Nickel cadmium batteries charged by solar cells.

TIROS I

Additional Data: * As of July 6, 1960, 108 MC continues to operate. Photo data interrogation effectively ceased on June 17, 1960.
Tiros combines the initials of Television Infra-Red Observation Satellite. Later models will have sensors to map relative temperatures of the Earth's surface.

Sources: NASA

Date: Prepared July 6, 1960

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

RELEASE NO. 60-223

FOR RELEASE: Immediate
July 1, 1960

TIROS, SATELLITE SENDS 22,952 PHOTO FRAMES; ENDS PICTURE ASSIGNMENT

TIROS I, after transmitting 22,952 picture frames since it was launched April 1, 1960, has reached the end of its operating lifetime. The highly successful, 270-pound satellite, orbiting at altitudes averaging 450 miles, gave meteorologists unprecedented opportunity to study the Earth's cloud cover and relate it to our weather.

During its operating lifetime, TIROS demonstrated the feasibility of observing by satellite the mechanics of the atmosphere. The experiment represents the first step in the long-range development of a U.S. operational meteorological satellite system.

Scientists of the U.S. Weather Bureau and other cooperating meteorological groups will be analyzing TIROS data for many months. This data has already made important contributions to meteorological research.

Among the most striking cloud patterns transmitted by TIROS are the large-scale cyclonic storms or vortices whose spiral bands sometimes reach over 1000 miles in diameter. The frequency and extent of highly organized cloud systems associated with these vortices was not fully realized before TIROS.

Other pictures have indicated the presence of jet streams, regions of moist and dry air, thunderstorms, fronts, and many other meteorological occurrences. Experimental use of TIROS pictures in meteorological analysis has resulted in increased accuracy, particularly in data-sparse areas such as over the oceans.

Of the 22,952 frames transmitted by TIROS, 17,449 were received at Fort Monmouth, N. J.; 4,698 from the narrow-angle camera, and 12,751 from the wide-angle camera. Kaena Point, Hawaii, received 5,503 frames; 1,117 from the narrow-angle, and 4,386 from the wide-angle camera. Of the total frames received, it is estimated that over 60 percent represent good quality cloud cover photographs useful to meteorological research.

The decision to discontinue attempts at interrogating TIROS I was made after orbit 1302 over Fort Monmouth about midnight Wednesday, June 29. The wide-angle camera system and all telemetry had ceased to function. (The 108.00 mc tracking beacon continues to operate.)

There appears to be some limited operational capability remaining in the narrow-angle camera system. However, it would be extremely difficult, perhaps frequently impossible, for meteorologists to identify and orient the narrow-angle camera pictures. The satellite's attitude sensors are not working and there are no longer wide-angle photos, which frequently pick up identifiable geographic landmarks, to assist scientists in orienting narrow-angle cloud cover photos.

Scientists believe an inoperative relay in the wide-angle camera system is the probably cause of TIROS' difficulty. The malfunction made it impossible for the camera to turn off. This apparently drained the batteries and eventually caused the wide-angle camera transmitter to burn out. This damage seems to have affected the entire satellite system.

TIROS interrogation was temporarily suspended on June 17, after 78 days of operation and after over 200 hours of individual camera operating time. On June 28 and 29, attempts to resume interrogation indicated that the satellite's effective operating lifetime was at an end.

It is planned to launch the next experimental meteorological satellite, TIROS II, later this year.

- END -

Phoned to Wilson + Carstaphen 11:10 AM., 7-1-60

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TIROS ENDS PHOTO TRANSMISSION
AFTER PROVIDING OVER 20,000 CLOUD COVER PICTURES

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- END -

HOLD FOR RELEASE UNTIL LAUNCHED

ANNEX I

Date July 1, 1960

A. For Release: After Launch

National Aeronautics and Space Administration today launched the first complete Scout rocket vehicle from Wallops Station, Wallops Island, Virginia, as part of an NASA program to develop a small, reliable and flexible solid-fuel research vehicle designed for a variety of space exploration tasks.

The 72-foot four-stage Scout, first all-solid fuel booster capable of orbital missions, left the launching pad at 8:04 Edt on a ballistic flight to determine the performance, structural integrity and environmental conditions of the vehicle and the guidance-controls system. The rocket was launched at an elevated angle of 85 degrees on an azimuth of 107 degrees. The planned trajectory would send the payload to an altitude of about 2,300 statute miles and about 4,700 miles downrange.

The Scout carried 193 pounds of payload. This included the instrumentation compartment to relay vehicle flight test data to ground receiving stations and a 23-pound package of flares.

These flares were carried in the Scout for visual observation of the flight path of the fourth stage. The 12 flares were attached to the skirt of the Altair and fired at intervals after fourth stage burnout.

The Scout fired today was essentially a prototype. The experience gained during the launching operation and flight will be applied in the future to improve performance of the 36,100-pound space research vehicle. Scout consists of the Algol, Castor, Antares, and Altair rocket motors -- all named for stars in the constellations.

Project engineer for today's test was James R. Hall of Langley. The Wallops launch team was directed by Robert T. Duffy.

Scout is the latest in a series of multi-stage, solid fuel research rockets developed under direction of the Langley Research Center, near Hampton, Virginia. Since 1945 Langley has teamed with Wallops to fire more than 3,000 research rockets of from one to six stages to study phenomena of aerodynamics and space flight mechanics.

The Scout concept originated in mid-1958 at the Langley Research Center -- in the Applied Materials and Physics Division (AMPD). A special Scout project group, under William E. Stoney, Jr., was formed at Langley to develop the vehicle.

Management of the Scout program at NASA Headquarters is under Elliot Mitchell, Assistant Director for Propulsion, Office of Launch Vehicle Programs.

In addition to today's test launch, operational flights will be conducted from Wallops, where a Scout launch complex was completed in early 1960. The complex includes a pad, launch tower, block house, and related ground support, electronics and tracking equipment.

As an operational vehicle, Scout will be able to place a 150-pound satellite into an orbit more than 325 miles above the earth and will loft a 50-pound scientific probe to an altitude of about 10,000 miles. In reentry body tests, Scout will permit simulation of conditions expected by a space vehicle returning to the earth's atmosphere. With a ballistic trajectory, it also will be possible to obtain two hours of zero-gravity environment with 100-pound experiments.

During development and test phases of Scout, NASA's Scout Project Group at Langley is acting as systems manager. Prime contractors and vendors in the program are:

Vought Astronautics Division of Chance Vought Aircraft, Dallas, Texas - launch tower fabrication and installation, airframe and motor transition section manufacturer.

Allegany Ballistics Laboratory, a Navy Bureau of Weapons facility operated by Hercules Powder Company at Cumberland, Maryland - third and fourth stage motor developments.

Aerojet-General Division of General Tire and Rubber Company, Sacramento, California - first stage motor development.

Redstone Division of Thiokol Chemical Corporation, Huntsville, Alabama - second stage motor development.

Aeronautical Division of Minneapolis Regulator Company, Minneapolis, Minnesota - guidance and controls.

Algol, which lifted the vehicle from its specially-built launch complex, is 30 feet long, 40 inches in diameter and develops 115,000 pounds of thrust. The first-stage rocket is fin stabilized and is controlled in flight by jet vanes. It is the largest solid rocket flown in the United States. Algol is named for a fixed star in the constellation Perseus.

The 20 foot-long second-stage Castor is 30 inches in diameter and has a thrust of over 50,000 pounds. The Castor, a modification of the Sergeant motor, has been used successfully in a cluster in NASA's Little Joe program in support of Project Mercury. On the Scout, the Castor is stabilized and controlled by hydrogen peroxide jets. Castor is the "tamer of the horses" in the constellation Gemini.

Antares, third stage, is 10 feet long and 30 inches in diameter, with a thrust in excess of 13,600 pounds. Stabilized and controlled by hydrogen peroxide jets and utilizing lightweight plastic construction throughout its design, Antares is a scaled-up version of the fourth stage and is the only motor developed specifically for Scout. Antares is the brightest in the constellation Scorpio.

Fourth-stage Altair, used extensively in satellite and other space research applications, is six feet long and 18 inches in diameter. This smallest of the four Scout rockets is spin stabilized and has a 3,000-pound thrust. Altair formerly was known as the X-248 rocket, developed for the Vanguard third stage. It is the third stage on the Able and Delta launch vehicles and was the first fully developed rocket to utilize lightweight plastic construction throughout. Altair is a star of the first magnitude in the constellation Aquilae, or Eagle.

Today's test was the first firing of a complete Scout. A Scout component test was conducted at Wallops Station on April 18, 1960, to investigate the performance of the previously unflown first and third stages. The second stage Castor was inert, and a nose cap was used to simulate the combined weight of the fourth-stage Altair and a typical payload.

The Algol first stage performed satisfactorily. The third-stage Antares did not ignite: The heat shield which covered the third stage became displaced, causing a structural failure in the vehicle prior to third stage ignition.

ANNEX IA Supplement

RELEASE AFTER LAUNCH

PAYLOAD

The 193-pound payload will remain attached to the fourth stage motor during the entire flight. The payload is protected during launch by a fairing which is jettisoned at third stage ignition.

The payload's mission is to measure performance of the Scout propellant system, its guidance system, and the effect of the space environment on the vehicle and its payload.

The fourth stage and payload are spin stabilized. They are mounted on a spin table which is spun up to three revolutions per second by three small lateral rockets just prior to fourth stage ignition.

A metal cylindrical collar -- about 20-inches in diameter and some 15-inches long -- is attached to the fourth stage. A plastic dome is mounted on its leading end with various measuring devices attached to its underside.

Four transmitters -- two for data transmission, one radio tracking beacon, and one radar beacon -- are monitored by tracking stations during flight. The transmitters and experiments are powered by some 190 liquid zinc silver cells.

One data transmitter broadcasts five channels of information on 244.3 MC at two watts of power. Its data include external temperature measurements and various measurements of the attitude of the vehicle and its position.

The second data transmitter sends 14 channels of information at eight watts on 240.2 MC. It will include data on compartment temperature, various motor pressures, and four accelerometers which indicate whether the payload is wobbling.

The second telemeter also transmits information from two magnetometers attached to the plastic dome, a Geiger-Mueller counter to measure secondary radiation penetration of the payload, and two aspect indicators. These are a Langley Research Center horizon scanner and a Naval Research Laboratory sun seeker also mounted under the plastic dome under small portholes.

The radio tracking beacon transmits with two watts of power on 108.08 MC and will be tracked from Wallops Station.

Four blade antennas are mounted on the cylindrical collar for the three radio transmitters. The radar beacon signal is radiated by a horn antenna which is fitted inside the collar.

The electronic package including batteries and mountings weighs about 110 pounds, the dome and attached measuring devices weigh 37 pounds, and the collar and antenna about 23 pounds. The flares, mounted on the skirt of the fourth stage, weigh about 23 pounds.

- 0 -

July 1, 1960

NASA announcement on the launch of the first Scout launch vehicle (about T + 45 minutes)

Three stages of the Scout rocket vehicle launched from Wallops Station, Va., at 8:04 p.m., EDT, tonight were fired successfully. Ignition of the first, second, and third stages occurred as programmed. Ignition of the fourth stage was prevented by a command signal from Wallops Station when the vehicle appeared to veer off course. NASA officials at the launch site said Scout reached an altitude of at least 860 (s) miles and a range of approximately 1500 miles.

Excellent telemetry was obtained through the flight of the first three stages. This was the first firing of three controlled solid propellant stages. The cause of the flight path deviation has not been determined. The 36,100-lb. space research vehicle was programmed for a ballistic flight to determine the performance, structural integrity and environmental conditions of the vehicle and the guidance-controls system.

This was the first attempt to launch a complete Scout rocket. It was essentially a prototype. The experience gained during the launching operation will be applied in the future to perfect performance in the Scout.

Corrections for Scout "Guidance and Control" fact sheet.

First page - fifth graf under "guidance" note that the three-rate gyros are not in the guidance compartment but near the lower end of the third stage.

Page two - third graf - first line: should read "Control is provided in the second stage by two pitch and <u>two</u> yaw hydrogen-peroxide jets...."

Page three - second line: should read "The four roll control jets continue operating during coasting to provide both roll and yaw control. Two additional two-pound-thrust jets, inactive during the thrust phase, provide pitch control during coasting flight."

HOLD FOR RELEASE UNTIL LAUNCHED

SCOUT

Guidance and Control

The Scout vehicle uses a "strapped down" precision guidance system. This is not a true inertial guidance system in which a free-floating gyro platform is used. In Scout, the three single-axis reference gyros are attached to the frame of the vehicle, itself.

Azimuth and roll orientation is maintained during flight at essentially the initial reference attitudes established at launch. Guidance of the Scout is confined to pitch.

The main components of the guidance system are the pitch axis programmer and the Miniature Integrated Gyro (MIG). Three MIG's, one for each reference axis, correct the vehicle's deviations from the programmed course.

The pitch axis programmer consists of two components--a timer, which provides a time base for the pitch program, and a programmer power supply. The programmer is a d-c power supply which sends signals to the pitch axis MIG through a set of six potentionometers.

The guidance compartment in the Scout is located between the third and fourth stages. The autopilot, pitch programmer, firing sequence programmer, MIG's, along with three rate gyros and other related instrumentation are contained in this unit.

CONTROLS

The first three stages of the Scout vehicle are controlled. The fourth stage is spin-stabilized.

The first stage control is provided by a conventional hydraulic position servo. A servo actuator in each of the Algol's four fins operate jet vanes and movable aerodynamic tip controls. The four jet vanes are emersed in the exhaust of the Algol motor and provide the majority of control during the thrust phase of the first stage. Small movable tips located at the outer ends of the fixed fins provide control during the Algol's coasting phase. Two servo actuators in the pitch plane fins (opposite sides) are synchronized and respond to pitch error signals. Two actuators in the opposing yaw plane fins control yaw and roll.

The small triangular steel tip controls measure 9½ inches on a side and weighs 9 pounds each. They have a base thickness of 1-3/4 inches, tapering to a point at the outer tip. The solid molybdenum jet vanes are 8-5/8 inches by 8-3/4 inches. Each weighs 36 pounds. The ends of the vanes have a plastic fibreglass wedge for flame protection.

Control is provided in the second stage by two pitch and yaw hydrogen-peroxide reaction jets, located in the Castor's skirt section. The jets have a nominal thrust of 450 pounds but are operated to yield 600 pounds for about the first five seconds of second stage burning flight.

Four 20-pound pressure jets provide roll control and operate differentially.

Hydrogen-peroxide reaction jets in the skirt of the Antares are used to control the third stage. To allow for long coasting periods after burnout (up to 600 seconds), the Antares has two sets of controls. During burning flight, four 44-pound reaction jets provide pitch and yaw control and four 2-pound jets, roll control. In the coasting period, after zero thrust, six two-pound jets are employed, two for each axis. Pitch control jets operate singly, the yaw jets in pairs, and the roll jets differentially in pairs.

Fourth stage control is accomplished by spin-stabilization.

The Altair is spun to 160 rpm by three small rockets mounted tangentially on a large diameter bearing located in the skirt of the fourth stage. Spinning is begun near the end of third stage coasting, prior to fourth stage ignition and separation.

- END -

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

FOR RELEASE: THURSDAY
July 7, 1960

RELEASE NO. 60-225

JODRELL BANK RADIO TELESCOPE

The Jodrell Bank radio telescope located near Manchester, England, is the largest instrument of its kind in the free world.

It was conceived by Dr. A.C.B. Lovell and designed and constructed by the engineering firm of H.C. Hubbard. It was financed jointly by the British government and the Nuffield Foundation and is located in an open field of the Jodrell Bank Station near Manchester in Cheshire, England.

Under Dr. Lovell's direction, the huge dish has been used to track both U. S. and Soviet earth satellites and space probes, to chart radio signals giving data on cosmic explosions, to observe the aurora, and to obtain information about the planets.

The Jodrell Bank installation assists NASA under contract. It was the only tracking facility in the free world capable of tracking the five-watt transmitter of Pioneer V beyond about ten million miles. Jodrell Bank has commanded the transmitter on and off and read out its scientific information to a distance of more than ~~23~~ 22.5 million miles.

The facility also participated in the recent transmission of radio signals between England and the United States by bouncing them off the moon.

The reflector bowl, made of welded steel plates, is 250-feet in diameter and focuses radio waves on an antenna mounted on a 62-foot tower in its center. The bowl and cradle assembly, weighing about 800 tons, are mounted on two steel lattice towers some 180 feet high and rotates vertically between them. The structure rotates horizontally on steel rails and is driven by electric motors. The movable part of the telescope weighs more than 2,000 tons.

Pilings were driven 90 feet into the ground to support the structure and some 10,000 tons of reinforced concrete were used for the foundations.

The structure can make one full rotation in azimuth in 18 minutes and one rotation in elevation in 15 minutes. Normal operating speeds to keep the telescope aimed at a specific point in space are, however, barely discernible to the eye.

All movements of the telescope are controlled by a single operator in the main control building and are accomplished electronically. An electronic panel can amplify signals up to 30 million to one.

Dr. Lovell believes that the Jodrell telescope will be able to identify radio-wave sources one billion to two billion light years away.

Studies by radio astronomers with telescope such as the Jodrell Bank facility eventually may lead to a decision between the two major scientific theories of the origin of the universe, according to Dr. Lovell. One theory is that all matter in the universe once was concentrated into a small mass which exploded to form the galaxies as we know them. The second proposes that matter constantly is being created and that, as old galaxies fly apart, new ones are created in the space between them.

Observations of the distances between galaxies as they were billions of years ago will lead according to Dr. Lovell, to a resolution of the two theories.

-END-

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

FOR RELEASE: July 7, 1960
4:00 PM, EDT

NASA Release No. 60-227

PIONEER V COMMUNICATIONS TERMINATED

Efforts to communicate with Pioneer V -- which is 27.5 million miles from Earth today -- have been terminated.

A six-minute message received on June 26 by Jodrell Bank, England, was the last communication from the 94.8-pound spacecraft. Since then repeated attempts over the past week to "talk" with the probe have failed. On the date of the last transmission, the spacecraft was 22.5 million miles from Earth and moving at a velocity relative to the Earth of 21,000 miles per hour.

Thus Pioneer V has exceeded the old long distance communication record of 407,000 miles -- held by Pioneer IV -- by more than 55 times.

In demonstrating the feasibility of deep space communication, Pioneer V used primarily a five-watt radio transmitter -- with an output no greater than that needed to light a Christmas tree bulb.

Since launch March 11, 1960, from Cape Canaveral, Fla., Pioneer V has traveled some 180 million miles or slightly more than one-third of its first complete 515-million-mile orbit around the Sun. Its path carries it between the orbits of Earth and Venus. It will fly 18 million miles closer to the Sun than any man-made object has ever flown.

The five-watt transmitter was used during most of the 106 days of the spacecraft's active life. The 150-watt transmitter, left idle during the first four weeks of Pioneer V's journey, responded promptly when commanded on for the first time on May 8 when the probe was eight million miles from Earth. Use of this transmitter, however, was limited because of apparent deterioration of the spacecraft's 28 flashlight-sized batteries.

Scientists believe any one or more of three reasons could account for the loss of contact with Pioneer V:

1. The spacecraft may be out of Earth range with its five-watt transmitter. (Earlier, technicians estimated contact via the five-watt unit would be lost at approximately 20 million miles.)

2. Battery failure of "leakage" induced by the "hard" vacuum of deep space. The batteries were charged constantly by solar cells in four paddles stretching out from the 26-inch spherical payload.

3. A failure of some key component or system.

A complete analysis of the Pioneer V system performance is under way by NASA and Space Technology Laboratories, Inc., of Los Angeles, which built the spacecraft.

Aside from its communication feats, the spacecraft, in transmitting 138.9 hours of data, has established these tentative but major scientific "firsts":

1. Instruments detected solar particles in transit between the Sun and the Earth, millions of miles from Earth.

2. Sudden decreases in cosmic ray intensity -- called the Forbush decrease -- do not appear to depend on the Earth's magnetic system as has long been theorized.

3. The intensity of the outer Van Allen radiation belt around the Earth is not produced directly by the injection of electrons from the Sun. Pioneer V and Explorer VII measurements made simultaneously indicate the electrons are somehow accelerated to higher velocities after being caught in the Earth's magnetic field.

4. Magnetometer data can be explained by the existence of a large ring current circulating around the Earth at from about 30,000 miles to 60,000 miles. Total current flowing inside this region of space has been computed to be five million amperes.

5. Provides evidence that the Earth's detectable magnetic field extends as far as 64,000 miles from Earth.

6. Suggests the existence of a measurable interplanetary magnetic field.

Throughout the flight, temperatures were monitored inside and out of the spacecraft. For example, solar cell paddles averaged 23 degrees F. about 12 hours after launch. Three months later, with Pioneer V some 18 million miles from Earth, paddle temperatures averaged 51 degrees F. as the spacecraft flew closer to the Sun.

Correspondingly, the internal temperature on the underside of a shelf forming the waist of the spacecraft, rose from 18 degrees F. to 30 degrees F.

Scientific data obtained during the flight came from instruments built by STL, the University of Chicago and the University of Minnesota.

- END -

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington, D. C.

Thursday, 7 July 1960

PRESS CONFERENCE
Pioneer V

The conference was called to order at 4:00 p.m., Mr. Walter T. Bonney, Director, Office of Public Information, presiding.

PRESENT:

Dr. T. Keith Glennan, Administrator, National Aeronautics and Space Administration.

Dr. Hugh L. Dryden, Deputy Administrator, National Aeronautics and Space Administration.

Dr. Abe Silverstein, Director, Office of Space Flight Programs.

Dr. John C. Lindsay, Director of Pioneer V.

Dr. Harry J. Goett, Director of the Goddard Space Flight Center.

Dr. Morton J. Stoller, Assistant Director, Office of Space Flight Programs.

GUEST:

Dr. A. C. B. Lovell, Professor of Radio Astronomy at the University of Manchester and Director of the Jodrell Bank Experimental Station.

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MR. BONNEY: Ladies and Gentlemen. This afternoon we are going to break this into two parts: First a brief activity that will involve some picture taking, I suspect, and then we will get into a discussion of the technical aspects of the subject at hand.

It is the very great pleasure of the National Aeronautics and Space Administration to have as its guest of honor today, and participate at this function, Dr. A. C. B. Lovell, Professor of Radio Astronomy at the University of Manchester, in England, and Director of the Jodrell Bank Experimental Station of that University.

Also at the head table, beginning on my far right, Dr. Abe Silverstein, Director of the Office of Space Flight Programs; Dr. T. Keith Glennan, Administrator of NASA; Dr. Lovell, and finally, Dr. Hugh L. Dryden, Deputy Administrator of NASA.

Dr. Glennan?

DR. GLENNAN: Ladies and Gentlemen. We are happy that you would come by this afternoon. We in NASA have been very privileged to have a truly fine example of international cooperation in connection with the experiments which we have been carrying on and will carry on in the exploration of outer space. This type of cooperation has gone on around the world, but nowhere has it been so fruitful, so effective, so genuine, as with our good friends in Manchester, England.

We asked Dr. Lovell, who conceived and fought for, helped to find the money for -- and as a college president I know what this means -- the instrument which we have come to know as the 250-foot Dish at the Jodrell Bank Station. That instrument has been invaluable in the carrying out of space experimentation, I think not only for our own country and the free world, but also for the satellites and probes of the Soviet Union.

Our principal reason for asking Dr. Lovell to visit us at this particular time is to take note of the activity in which his colleagues and he have been concerned for the past several weeks -- I guess we ought to say months -- in connection with the flight of Pioneer V in its orbit about the Sun.

Since March 11, the launch date, the big dish has been tracking, talking to, and listening to Pioneer V until on the 26th of June, some eleven days ago, the last intelligible bit of information came from that probe.

Without the participation of the good people at the Jodrell Bank Station we would have lost contact with Pioneer V some weeks earlier. We are really grateful for this kind of cooperation which has been given so freely to us. It is typical, I think, of the relationships between our two great nations.

To show in some small measure our sincere and deep appreciation for these activities on the part of our British colleagues we have had put together here a little memento which we hope will find a place in the Jodrell Bank Station Administration Building -- I suspect you have one of those -- which perhaps over the years will remind you of an interesting, fruitful, and exciting experiment.

It is my great pleasure, Dr. Lovell, to hand to you this model of Pioneer V which we have had made, with a little instrument inside which plays a tune which is dear to the hearts of the people of both of our nations. We say, "My Country, 'Tis of Thee," and you say, "God Save our Gracious Queen." Dr. Lovell, it is a pleasure to have you here with us and to present this token of our esteem and appreciation for your efforts and cooperation with us in this activity.

DR. LOVELL: Dr. Glennan, Gentlemen: I am very pleased to be here and to be presented by NASA with this beautiful memento of the cooperation between us, which I think can only be described as historic.

The telescope at Jodrell Bank was not designed for tracking space probes. In fact, it was conceived and built long before either the

Soviet Union or the United States announced their intention of launching earth satellites.

It is one of these strange and quite remarkable accidents of history that Sputnik I went into orbit just as the telescope came into use. In fact, the very first job which the telescope did was to track the carrier rocket of Sputnik I by radar.

While we have been in a rather unique position of having reasonably friendly cooperation with the Soviet Union and with the U.S.A., of course our relations with the U.S.A. have been completely different. We have had a team of American scientists working with us now for over two years in a most happy and fruitful relationship on many occasions of great interest when history was made, such as in the launching of the first Pioneer, which with a bit more luck would have gone close to the moon as was intended, and then more recently in this remarkable device which you call Pioneer V.

It has been a privilege for me and my colleagues to have had an instrument which has been able to play this unique part. As Dr. Glennan said, it is very happy that the close friendship and relationship between our two countries has been further exemplified in this way.

As a person who lives in a kind of neutral state, on looking at the advance of space research in the East and West, one has seen some most interesting developments in the past few years, on which on occasion each side seems to be gaining what you call the edge in space research.

In 1959, just as things looked fairly evenly balanced, the Russians achieved this remarkable event of hitting the moon with Lunik II, and a few weeks afterwards orbiting Lunik III around the moon. But I think at this time the United States was very rapidly catching up in space research. Explorer VI, which we had a hand in tracking, did really produce most vital information about conditions in inter-planetary space. The same kind of instruments which eventually went off in Pioneer V worked superbly. I think that some of the most remarkable discoveries in science had been made in this instrument during the last few months.

I think that you in the United States should feel very happy with the position which these recent deep space probes in your many satellites have given you in the international competition of space research.

I would be very happy to answer any questions about Jodrell Bank, or our cooperation.

Before I end this short speech, may I again thank you, Dr. Glennan, for inviting me here on this very happy occasion.

MR. BONNEY: Thank you, Dr. Lovell.

Before we get into the question and answer period, because both Dr. Glennan and Dr. Dryden have to leave for a meeting that they have broken away from to be here this afternoon, I would like to call on Dr. Dryden to speak briefly about some of the aspects of international cooperation in this space business.

DR. DRYDEN: My part in this is simply to emphasize the vital role of international cooperation in the exploration of space. We see in this particular incident a case where another country had in existence an instrument which could supplement and extend the observations of one of our space probes. There are other instances that many of you know where we have used facilities in other countries for receiving telemetry from satellites in those cases where storage was not provided.

As our program goes forward we see other very vital roles of international cooperation. Other countries have scientists, broad knowledge and experience, scientists with new ideas, and, in the case of Great Britain, as you know, we have under way a cooperative program with other scientists in Great Britain to carry out certain scientific measurements in space.

We have discussions under way with many other countries and are making great progress, in which we try to ascertain the interests of other nations in space exploration to find ways in which we can encourage and help in carrying out cooperative programs.

I think that this occasion today is, I hope, the first of many others in which there will be vital contributions to the exploration of space through citizens of many other countries in the world.

MR. BONNEY: Thank you, Dr. Dryden.

We would like to invite to come up to the head table some gentlemen who participated in a very real way in the Pioneer V experiment: Dr. Harry J. Goett, Director of the Goddard Space Flight Center; Dr. John C. Lindsay, Director of Pioneer V; I believe it is Doctor -- certainly he deserves it -- Dr. Morton J. Stoller, who is assistant director in Dr. Silverstein's shop for satellite and sounding rocket programs and who gave some very real supervision to this.

Dr. Silverstein has a few brief comments. Then we will open the question and answer session.

DR. SILVERSTEIN: First, I think I would like to express myself on behalf of the operating group at NASA our sincere appreciation for the cooperation which Dr. Lovell has provided. I think we can say it was absolute cooperation, that no demands or requests were made of Dr. Lovell that weren't fulfilled in the most sincere way and with great friendship. We will go forward as we utilize the 250-foot antenna for the whole Pioneer series through its use in some of our future space craft flights.

It may be of interest for me to mention a few vital statistics with reference to Pioneer V and some of the results which have been obtained through this cooperative effort with Dr. Lovell.

We received the last radio signal from Pionner V on June 26, 1960, three and a half months after it began its heliocentric orbit in interplanetary space. The last signal from Pioneer V ceased at 7:33 a.m., eastern daylight time, June 26th, at which moment the vehicle was 22,462,740 miles from the antenna at Manchester. The separation velocity between the space craft and the receiving antenna at this time was 18,621 miles per hour. At its last transmission it was 78.9 million miles from the center of the sun, and had traversed 60 percent of the distance which separates the orbit of Venus from the orbit of the Earth.

It may be of interest to know some of the scientific discoveries that were realized in this Pioneer V mission. They may be summarized briefly in this way:

1. That an interplanetary magnetic field exists and that this field fluctuates in intensity in a way connected with the solar flaring activity. This had been picked up in earlier interplanetary flights. It was very, very substantially established during the Pioneer V flight.

2. The ring current, some 25,000 miles in diameter, exists at 40,000 miles from the Earth with a current flow of about 5,000,000 amperes. This exists as the donut around the Earth.

3. That the geophysical magnetic field extends at times out to 65,000 miles, and that this magnetic field oscillates in intensity in its outermost part as a function of the solar activity.

4. The measurements of the penetrating radiations in space have shown that difficulty will be experienced not only in the Van Allen radiation belt but in outer space due to the solar particles and that the man in space, through the Van Allen Belt and outside of it, will need extensive protection from the radiation.

Technologically, all components of Pioneer V have worked quite satisfactorily throughout its whole lifetime, except for the problems we have had with the storage batteries which I think would have led eventually to its failure to transmit. These batteries have been diagnosed as decaying slowly during the flight time and our only surprise here was that during the last few days of the flight in some fashion they seemed to have regained energy. This has as yet not been explained.

It might be of interest simply to recount what might be called highlights or records established by Pioneer V.

1. Technologically Pioneer V established the greatest range over which man has maintained control of an instrumented vehicle.

2. The greatest range over which man has tracked a man-made object.

3. The greatest range from which man has received telemetry.

4. The first instrumented space laboratory making measurements of the following physical properties of interplanetary space: the interplanetary magnetic field; the plane or direction of this magnetic field; and radiation in interplanetary space, including both the total flux and the energy level.

5. The record that has been established is that Pioneer V included the first use of an interplanetary guidance system.

6. It is the greatest velocity of any man-made vehicle, some almost a thousand feet greater than the velocity of escape from the Earth.

It is the first real interplanetary probe to carry its own self-sustaining power supply.

It was the first of the space craft to provide attempts to control, compensate for the increased heating associated with the motion of the probe in toward the sun in its orbit toward Venus.

These are technological firsts. Some scientific firsts can be recorded as follows:

1. It was the first quantitative mapping of interplanetary space magnetic field.

2. The first quantitative measurement of the interaction of the solar wind and the geomagnetic field.

3. The first real verification of the ring current. It had been noted before.

4. Discovery that the Forbush decrease, which is a measure of the decrease in the cosmic ray intensity at the beginning of a solar flare, is wholly an interplanetary phenomena and not associated with the field around the Earth.

5. It is the first measurement of the radiation level of interplanetary space.

6. The first measurement of the influence of the solar wind on the Van Allen radiation belt.

7. The first measurement of the size of the solar system by means of a space probe.

That concludes my remarks. I think we can open the meeting to questions from the floor.

MR. BONNEY: We are making a transcript of this. Would you address your questions to either Dr. Silverstein or Dr. Lovell. I will try to repeat them so that we can get them accurately on the record. We should have the transcript ready about nine o'clock tomorrow morning.

Parenthetically, may I say to Dr. Lovell that had he been able to get here a week earlier I am quite sure that the two Congressional space committees would have been most anxious to have him come and talk to them. I see staff members from both. In this country, sir, we have a sort of political mating known as conventions, and the Congress is in recess.

Gentlemen, your questions.

QUESTION: Dr. Lovell, this is a question about a recent article you wrote for a British publication called "The New Scientist", in which you recommended the establishment of an independent British space program, using the Blue Streak - Black Knight Rockets. One of the points you make is that you don't think you could get space aboard a first-line American rocket vehicle for your satellite probe experiments. I wondered whether you expected with your program that you could have vehicles any earlier than you could expect such space in American vehicles?

DR. LOVELL: I must say I am rather shattered at being presented with this article in the United States. It was, of course, written for internal consumption through the U. K., because opinion in the U. K. is very sharply divided, as you may know, as to whether we can afford the few million pounds which some of us regard as absolutely necessary if we are to go on and survive as a reasonably technological nation. I would be very sorry if the remark on which you picked would be taken as indicating any lack of faith or friendliness in American cooperation. I am sure you won't. But that, after all, is only common sense, that any nation, however friendly with another nation, isn't going to give it a device before it has tested it itself. That is all I mean there.

The only kind of experiments in which Great Britain is likely to be able to engage are not as ambitious an experiment as your Pioneer V. The studies that have been done with the Blue Streak-Black Knight indicate they could provide us with the necessary payload and platform which could give us a program for many a long day.

The remark I made there is what I think probably is common sense at least as to some of those that probably could be gotten from Blue Streak-Black Knight before they could be made available before what is, after all, a very crowded United States program

QUESTION: I wonder if Dr. Silverstein would tell us more about this inter-planetary guidance system. Does that mean Pioneer V was guided in any sense after it was in orbit?

DR. SILVERSTEIN: In Pioneer V there were the elements of the guidance system in that we had doppler capability for measuring position in space, which are parts of advanced guidance systems that are to be used in our future investigations.

QUESTION: Dr. Lovell, going back to the question by Mr. Simmons, I gathered from your remarks that you would not be content with a program in which British scientists would build payloads and would use American rockets to put them into orbit or into space?

DR. LOVELL: No, what you say is correct: I would not be content. I think that the arrangements which have been made for the instrumentation of United States payloads is extremely valuable, but this isn't good enough for a country which wants to have a thriving science and technology of its own.

The demands which the further development of the Blue Streak and Black Knight with their own payloads place on engineering and industry in Great Britain will not be faced if we merely have to instrument American payloads.

I would also, personally, take an extremely serious view of a nation like Great Britain which voluntarily, for the sake of a few million pounds, "opted" out of its immediate association with the development of rocketry, even though at the present time a military decision has been made not to use them. I think it would be a grievous error not to keep one's engineers and scientists in touch with these developments, because the whole military strategy is clearly in a phase of being transformed. And at the moment no one can see where we should be in the next one or two decades.

MR. BONNEY: Mr. Logan, of the Associated Press.

QUESTION: Dr. Lovell, what are some of the projects that you could launch with the Blue Streak-Black Knight combination?

DR. LOVELL: The studies which are to be made of the Blue Streak-Black Knight possibilities indicate, I think, as mentioned in the article, the exact figures, quite useful payloads of the order of a thousand pounds or so for earth satellites, out to a hundred pounds to several earth radii. As a whole, the range of experiments in Great Britain, some of them similar to the ones which you have flown in America but also a lot of new ones, particularly those in which I am interested, in the radio astronomical field, which one could do extremely well with this combination.

QUESTION: Dr. Lovell, your proposal seems to go counter to the trend of rocket development in this country. We are in the process of changing most of our rockets from liquid to solid. You are essentially proposing that you continue the development of a large liquid-fueled rocket merely for the purpose of providing space payloads.

DR. LOVELL: - I am not a rocket engineer. I am fundamentally an astronomer. I have a very general interest in this simply because I believe in the progress of space research. In the case of Blue Streak and Black Knight, I think a lot has been done. It is just a question of using relatively fewer of them. The modifications are not very great for this space program.

QUESTION: Do you mean development work on this program; there isn't very much development work being done?

DR. LOVELL: Not very. I am informed by the people who have done this that, well, Blue Streak wasn't intended to be fired this year; and Black Knight, as you know, there have been several successful firings.

MR. BONNEY: You have a question of Dr. Lovell?

QUESTION: The American radio telescope, a very large one at Sugar Grove, now is running into a cost of something like $100,000,000. I wonder if you could tell us how much your own radio telescope cost and for how much you think you could build one that size at Sugar Grove?

DR. LOVELL: The radio telescope at Jodrell Bank, if you forget the control building, cost six hundred thousand pounds, which is under $2,000,000. What we could build one for at Sugar Grove, I haven't the slightest idea.

QUESTION: Getting back to your astronomy background, you built this to do radio astronomy work. I wonder to what extent all these space experiments coming along have interfered with your basic astronomical research and to what extent you feel it necessary to build such a scope as yours just for space tracking?

DR. LOVELL: The position there is this: The radio telescope came into use in 1957 and it has completed almost three years of research. We have done 11,000 hours of research with the radio telescope. Of those 11,000 hours only 1,000, about ten percent, has been spent on either the Russian or American space activities.

Of course, the program of the telescope is extremely full, and if I had two like it, then it still wouldn't be enough. Therefore, the question as to whether one spends any time on these space activities is a matter of personal judgment as to the value of doing this work against the other programs.

It will be clear from what I have said that I have assessed very highly the use of the telescope in assisting in the tracking, for example, of Pioneer V to a distance which would not have been possible otherwise.

Was there another part to your question?

QUESTION: Is there a need arising to construct a similar telescope just for space tracking purposes?

DR. LOVELL: I think I really ought to hand this question over to Dr. Silverstein. Obviously for the tracking of probes deep into space one must have large dishes. The question as to whether you go in for large dishes as against smaller dishes and higher frequencies is a question which has many facets to it, and this has been very deeply studied by NASA. I really think perhaps in this company I should defer the question to Dr. Silverstein.

MR. BONNEY: Would you care to comment further?

DR. SILVERSTEIN: I think it is quite clear that as we take on advanced missions in which we want to get broad-band reception at distances of Mars to receive, for example, television pictures of the surface of Mars, that we will need data acquisition aids in some form or other of rather substantial size.

QUESTION: What was the largest communication distance accomplished by the Lunik as compared with 27.5 million miles reached by Pioneer V?

DR. LOVELL: Lunik II impacted the moon and therefore that was just short of a quarter million. Lunik III went out to 290,000, just under 300,000.

QUESTION: Sending signals?

DR. LOVELL: Oh, yes. The first photographs were transmitted back from about 300,000. In the case of Lunik I, the Russians claimed to have tracked Lunik I to about a half million miles, I think, but we had no part in that. We could not find the signals.

DR. SILVERSTEIN: Actually, 396,000 miles .

DR. LOVELL: Those distances were exceeded already by Pioneer IV, were they not?

DR. SILVERSTEIN: Yes.

MR. BONNEY: To make sure that you have that number, the maximum distance the USSR claims to have tracked any of the Luniks is just short of 400,000.

DR. SILVERSTEIN: Pioneer IV was tracked for 417,000.

QUESTION: Dr. Lovell, toward the end of the messages received from Pioneer V, was meaningful scientific information being telemetered back, or was it just plain signals?

DR. LOVELL: For some time toward the end of the contact precession was very short. On a few occasions Dr. Silverstein said, I think, the batteries seemed to recover their energies in the last few days, and some useful telemetry was received. Actually it was during these times that some of these data, on exact frequencies, were obtained during the last weeks of this mission.

MR. BONNEY: Gentlemen, if there are no further questions, we thank you, and we thank Dr. Lovell for his patience.

(Whereupon, at 4:40 p.m., the press conference was concluded.)

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D.C.

Office of Public Information

July 14, 1960

INTERNATIONAL
SATELLITE AND SPACE PROBE SUMMARY

The following space vehicles are in orbit as of this date:

NAME/COUNTRY	LAUNCH DATE	TRANSMITTING
Explorer I (US)	Jan. 31, 1958	No
Vanguard I (US)	March 17, 1958	Yes
*Lunik I (USSR)	Jan. 2, 1959	No
Vanguard II (US)	Feb. 17, 1959	No
*Pioneer IV (US)	March 3, 1959	No
Explorer VI (US)	August 7, 1959	No
Vanguard III (US)	Sept. 18, 1959	No
Explorer VII (US)	Oct. 13, 1959	Yes
*Pioneer V (US)	March 11, 1960	No
Tiros I (US)	April 1, 1960	Yes
Transit I-B (US)	April 13, 1960	Yes
Spacecraft (USSR)	May 15, 1960	No
Midas II (US)	May 24, 1960	Yes
Transit II-A (US)	June 22, 1960	Yes
NRL Satellite (US)	June 22, 1960	Yes

*In solar orbit: others in earth orbit.

CURRENT SUMMARY (July 1, 1960)

Earth Orbit:	US - 11	USSR - 1
Solar Orbit:	US - 2	USSR - 1
Transmitting:	US - 7	USSR - 0

COMPLETE SUMMARY (Launched to date)

Earth Orbit:	US - 21	USSR - 5
Solar Orbit:	US - 2	USSR - 1
Lunar Impact:	USSR - 1	

RELEASE NO. 60-229

FOR RELEASE: Friday, 10 a.m., EDT
July 15, 1960

NASA STATEMENT ON FIRST COMPLETE SCOUT VEHICLE

The National Aeronautics and Space Administration today reported the cause of the aborted flight of the first complete Scout vehicle, launched at 8:04 PM EDT, July 1, 1960 from Wallops Station, Virginia.

Three stages of the Scout were fired successfully. Ignition of the first, second, and third stages occurred as programmed. Ignition of the fourth stage was prevented by a command signal from Wallops Station as a safety precaution when the vehicle developed an excessive roll rate and appeared to deviate from its programmed course at a height of 140 miles.

Excellent telemetry data was obtained, and subsequent examination of these data has revealed that while the vehicle did roll, the apparent deviation in the flight path was due to a sudden shift of the radar and not due to vehicle change of direction.

The data indicated that all three rocket motors and the guidance and control system performed satisfactorily, with the exception of excessive third stage roll. The vehicle followed its predetermined course well within its design accuracy limitations. The 3rd and 4th stages, which remained together as programmed, reached an altitude of at least 860 miles and landed in the Atlantic Ocean approximately 1500 miles from Wallops.

Three areas requiring detailed examination and possible modification in future Scout vehicles were uncovered: 1. The protective covering for the 3rd stage motor which normally would be jettisoned at 3rd stage ignition came off as the vehicle passed through the transonic flight zone during first stage burning. The flight of the vehicle was apparently not affected by the premature loss of the shield. 2. Toward the end of 3rd stage burning, vibrometers located on the guidance package measured higher vibration forces than had been anticipated. Again no known failures resulted from this phenomena. 3. There was an over-powering of the 3rd stage roll control, probably by a torque from the 3rd stage motor just prior to burnout, which caused the 3rd stage to roll beyond its limits. However, roll, pitch and yaw control performed normally after motor burnout.

This was the first attempt to launch a complete Scout vehicle. The 36,100-lb. space research vehicle was programmed for a ballistic flight to determine the performance, structural integrity and environmental conditions of the vehicle and the guidance-controls system.

NASA

NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

FOR RELEASE: TUESDAY, A.M.
July 19, 1960

RELEASE NO. 60-230

ROBERT C. SEAMANS TO SUCCEED RICHARD E. HORNER AS NASA'S ASSOCIATE ADMINISTRATOR

Robert C. Seamans, Jr., 41, chief engineer of the Missile Electronics and Controls Division of the Radio Corporation of America, has been named Associate Administrator of the National Aeronautics and Space Administration, effective September 1, it was announced today by T. Keith Glennan, NASA Administrator.

At the federal space agency, Dr. Seamans will occupy the top career post, serving under the presidentially-appointed Administrator and Deputy Administrator. He will succeed Richard E. Horner, who resigned earlier this month to become senior vice president, technical, at Northrop, Inc.

"Mr. Horner has brought inspiration, leadership and great personal devotion and ability to the task of developing a management organization within NASA," Dr. Glennan said in making the announcement. "And I am very grateful for his willingness to stay on this vital job beyond the period originally agreed upon. I count it a great piece of good fortune that we have been able to secure the services of Dr. Seamans--a man of proven ability in the fields of science, technology and engineering management so vital to NASA--to provide a continuing high order of leadership for our operating organization."

A graduate of Harvard University, and the possessor of master's and doctor's degrees from the Massachusetts Institute of Technology, Dr. Seamans has been active since 1941 in the fields of missiles and aeronautics. From 1941 to 1955, he held teaching and project-management positions of increasing responsibility at M.I.T., including from 1949 to '55, associate professor of the Department of Aeronautical Engineering; from 1950 to '55, chief engineer of Project Meteor, and from 1953 to '55, director of the Flight Control Laboratory.

When Dr. Seamans went to RCA in 1955, it was to become manager of the Airborne Systems Laboratory and chief systems engineer of the Airborne Systems Department. In 1958 he became chief engineer of the Missile Electronics and Controls Division, and in this capacity has supervised all scientific engineering and technical personnel in the division.

No stranger to NASA and its predecessor organization, the National Advisory Committee for Aeronautics, Dr. Seamans from 1948 to '58 served on technical committees of NACA. From '57 to 1959 he was a consultant to the Scientific Advisory Board of the Air Force, and earlier this year was appointed a member of that Board.

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NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 EXECUTIVE 3-3260

FOR RELEASE: FRIDAY P. M.
July 22, 1960

RELEASE NO. 60-231

NASA TO OUTLINE PROGRAMS TO INDUSTRY

The National Aeronautics and Space Administration next week will outline its program to some 1,300 representatives of industry, other government agencies and university research activities.

The classified briefing conference, first undertaken by NASA, is scheduled for Thursday and Friday (July 28-29) in the Interdepartmental Auditorium on Constitution Avenue, between Twelfth and Fourteenth Streets N.W., Washington, D. C.

"It is NASA's policy to utilize to the maxium the capabilities and resources of industry," said T. Keith Glennan, NASA Administrator. "This requires that industry be well-informed of NASA's programs and goals, both for the immediate future and for the next 10 years. It is the objective of this conference to so inform industry."

The two-day program will be divided in five parts. At the first session Thursday, Dr. Glennan and senior NASA staff members will describe NASA's missions, long-range plans and organization. Other sessions Thursday and Friday will deal with advanced research, launch vehicle and space flight programs.

The final session will be devoted to business administration matters, including some pointers on how to do business with NASA.

Admission to the conference is by invitation only. Those attending must have security clearance.

Dr. Glennan said NASA centers elsewhere will undertake similar briefing conferences. These conferences, however, will deal more directly with the technical activities of the centers and specific kinds of industry support they require.

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NEWS RELEASE

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
1520 H STREET, NORTHWEST · WASHINGTON 25, D. C.
TELEPHONES: DUDLEY 2-6325 · EXECUTIVE 3-3260

FOR RELEASE: TUESDAY P.M.
July 26, 1960

RELEASE NO. 60-232

DR. VICTORY RETIRES

Dr. John F. Victory, special assistant to the Administrator of the National Aeronautics and Space Administration, is retiring at the end of this month after nearly 52 years of continuous government service. Dr. Victory's career saw the beginnings of both the airplane and space ages.

Dr. Victory, 68, first went to work for the government on December 10, 1908 as a messenger for the Patent Office.

In 1915, the National Advisory Committee for Aeronautics was established and Dr. Victory was the first employee hired by the new agency. He was appointed secretary in 1921 and in 1948 was named executive secretary of NACA and placed in general charge of its administration.

Dr. Victory served in this capacity until October, 1958, when the National Aeronautics and Space Administration was established and absorbed NACA. Since then, he has been a special assistant to T. Keith Glennan, NASA Administrator.

Dr. Victory was active in establishing NACA research facilities, participated in bringing industry members together, helped formulate national and international air regulations and represented NACA before Congress.

Over the years he became known as "Mr. Aviation." His friends in the industry ranged from Orville Wright to the builders of the fastest jet fighters. He received many awards and honors, including a Presidential Medal for Merit in 1947 and the first Air Foundation Certificate of Recognition, and the Wright Brothers Memorial Trophy in 1958.

Employees and associates at NASA and its predecessor, NACA, will honor Dr. Victory with a retirement party Wednesday evening (July 27) at the National Press Club in Washington.

[illegible] [illegible], 1960

MEMO TO [illegible]

DIGEST OF MA-1 [illegible]

This test will be repeated at an early date. Obviously we didn't learn all the things we had hoped to learn, but we did learn some significant facts. For instance, the abort sensing and implementation system (ASIS) did register a signal that trouble was developing and transmitted this signal in sufficient time so that if the capsule had had a full escape system, we're confident it would have [illegible] from the booster in time. This signal came seconds before all telemetry [illegible] with the booster ceased at approximately [illegible] seconds. The capsule itself had no chance for parachutes to work because they [illegible] Atlas [illegible]. The capsule, apparently [illegible], probably still joined to the upper section of the booster, [illegible] miles [illegible] the Cape. It likely [illegible] water [illegible] still are [illegible].

Under adverse conditions such as [illegible], there [illegible] attempt to launch a manned capsule. [illegible] would be permitted for [illegible].

Telemetry [illegible] capsule [illegible]

[illegible]

Today's [illegible]

[illegible]

Mercury

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

Annex I, Item I

Test of 7/29/60

Hold For Release
Until Launched

Release No. 60-233

MA-1 CAPSULE FLIGHT TEST

Purpose of the MA-1 (Mercury Atlas One) flight test is to qualify the production version of a Mercury capsule shell by putting it to one of the most severe tests a Mercury capsule may face -- a mission abort during powered Atlas flight.

The suborbital ballistic profile of this flight calls for a programmed re-entry which will subject the capsule's bell-shaped afterbody to extremely high temperatures and high air-load conditions. These conditions will be far more severe than those the capsule would encounter in re-entering after a normal orbital flight.

This is the first Atlas-boosted flight of the production version of the Mercury capsule. A NASA-made research and development version of the capsule, however, was test flown September 9, 1959, off an Atlas from AMR; four similar models, boosted by Little Joe rockets, have been flown in the past 10 months from NASA's test station at Wallops Island, Va. (See Project Mercury Background) Two of the Little Joe capsules contained a monkey. The MA-1 capsule in today's test, however, will not carry a monkey, nor will it carry a man or any biological specimens.

The MA-1 capsule, measuring six feet across the base and standing nine feet high, is to be boosted by an Atlas to an altitude of

110 (statute) miles and a speed of approximately 13,000 (statute) miles an hour. If all goes according to plan, the one-ton capsule should land some 1,500 (statute) miles downrange about 20 minutes after launch.

The capsule has been stripped of several systems for this flight. For instance, the 16-foot escape tower which would normally ride on top of the capsule has been omitted. So have the environmental control system, astronaut couch, and the stabilization and control jets which in later flights will position the capsule blunt-end forward after separation. Emphasis in this test will be on capsule structure and afterbody heating.

When the capsule slams back into the atmosphere some 50 (statute) miles above the Earth, maximum air loads and temperatures in the neighborhood of 1,500 degrees F. are expected on the nickel-alloy afterbody shingles. On the blunt face of the capsule's ablation heat shield, temperatures are likely to hit 3,000 degrees F.

At the same time, the capsule will be subjected to as many as 16 G's -- twice the G load it would have to take in re-entering after a normal orbital mission. This is due primarily to the sharp re-entry angle programmed for this flight, four to five times sharper than the normal orbital return angle of about 2 degrees.

Assuming an entirely nominal flight -- which is not easy to assume in so complicated a system -- the flight sequence goes like this:

About four minutes after launch, the Atlas sustainer engine will be shut down prematurely by the Atlas' internally programmed and ground-command guidance system. At this point the Atlas should be about 100 miles above the earth.

Seconds later, explosive bolts on a clamp ring locking booster to capsule will fire, freeing the capsule. Then small packages of rockets attached to the blunt end of the capsule will ignite, pushing the capsule away from the booster.

A 20-inch stub tower at the top of the capsule then will be jettisoned. This stub built especially for this flight will be replaced in other flights by the 16-foot escape tower.

By this time, the capsule should have coasted to an altitude of 110 miles and started to arc over on the downward leg of its ballistic path.

When the capsule hits the Earth's atmosphere, it will be moving at a speed of 13,000-odd miles an hour. Several minutes later, the thickening atmosphere alone will have slowed the capsule to about 700 miles an hour. Before it hits the water, two parachutes will have pared its speed to a mere 20 miles an hour.

When the capsule reaches roughly 42,000 feet, an altitude-sensitive switch called a barostat will initiate deployment of a drogue (or ribbon) parachute. The lid on the upper antenna canister will be blown free before a mortar charge ejects the chute. This drogue chute slows the capsule's descent speed from around 700 miles an hour to about 200 miles an hour.

At 10,000 feet, another barostat is to start a similar sequence which opens the main 63-foot cargo chute, designed to ease the capsule down on the ocean. This action releases the main antenna canister, energizes an impact switch, turns on a flashing recovery light and activitates two radio rescue beacons. It also releases aluminum strips to aid radar location.

At touchdown, the impact switch will disconnect the main chute and turn off all capsule electrical power except that required to operate location aids. These also include sea-marking materials and two SOFAR bombs to be exploded at varying depths for sonar location aid.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

Annex I, Item 2

Hold for Release
Until Launched

Release No. 60-233

MA-1 CAPSULE INSTRUMENTATION

The Project Mercury MA-1 capsule flown in today's test is a production capsule built by the McDonnell Aircraft Corp. of St. Louis, Mo. For this test, the capsule has been outfitted with special instrumentation developed by the engineering staff at NASA's Lewis Research Center, Cleveland, Ohio, and installed by engineers of NASA's Langley Research Center, Langley Field, Va.

This capsule does not contain all of the systems which will be included in later suborbital and orbital flights. Notable among those systems omitted in today's test are the environmental control system, astronaut couch and control panel and the attitude and stabilization control jets.

Bolted to the floor and various points inside the capsule are more than 200 pounds of sensing instruments, cameras, recorders and a telemetry system.

The latter provides 16 channels of continuous or commutated information. This system will transmit continuously for most of the flight except for a critical minute or two during re-entry when its signals will not be able to pierce an ionized blanket which will envelope the capsule. This system will stop transmitting when the main antenna canister is jettisoned at approximately 10,000 feet before touchdown.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

ANNEX 1, Item 3

Hold for Release
Until Launched

Release No. 60-233

U. S. AIR FORCE ATLAS

In today's flight test, studies will be made of an abort-sensing-and-implementation system in the Atlas, a system which is designed to insure the safety of astronauts in later flights.

Prime elements in the trouble-sensing system are a series of electronic monitors, located at various points in the Atlas, which check performance of engines, airframe integrity, electrical circuits and the motion of the booster airframe.

In future flights, if a sensor detects a significant variation in booster performance, the abort-sensing system would flash a signal to the capsule escape system which would then immediately separate capsule from booster. In today's flight, however, the primary element of the escape system -- a 16-foot superstructure topped by a solid-propellant rocket above the capsule -- has been omitted. Thus the abort-sensor system in today's flight will be operated on an "open loop" basis -- it will be able to sense any failings in the booster but there will be no escape system for it to trigger. It is important to qualify the system on an "open loop" basis before all systems are connected later.

The system is presently being tested aboard research and development flight tests of the Atlas weapon system on a piggy-back basis.

The abort system, designed for the Air Force and the National Aeronautics and Space Administration by Convair Astronautics under the technical direction of the Space Technology Laboratories, does not become activated until the Atlas has lifted eight inches off the launch stand. Prior to that an abort could be accomplished by the test conductor in the blockhouse or in the case of a manned flight, by the astronaut, himself. A signal from either could throw the capsule 2,500 feet in the air and deploy a capsule parachute.

The abort-sensing system functions from the eight-inch liftoff point until the time of programmed separation of capsule from booster.

Mated and ready for launch, the Atlas and the capsule stand 85 feet high. The Atlas develops more than 360,000 pounds of thrust and fully fueled, weighs over 250,000 pounds.

ANNEX 1, Item 3

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D.C.

ANNEX I, Item 4

Hold for Release
Until Launch
Release No. 60-233

PROJECT MERCURY RECOVERY FORCES

A task force commanded by Rear Admiral F. V. H. Hilles, will attempt to recover the Mercury Capsule and antenna canister in today's test. The task force consists of units of the Destroyer Force, Amphibious Force, Service Force, Fleet Marine Force, Air Force Missile Test Center, and the Air Rescue Service. Admiral Hilles, Commander Destroyer Flotilla Four and Commander Project Mercury Recovery Force, will command the Recovery Force from the Atlantic Missile Range Control Center at Cape Canaveral.

The task force is comprised of several task groups, each under an individual commander. One task group consists of numerous land vehicles and small craft from the Air Force Missile Test Center. This group will be under the command of Lt. Col. Harry E. Cannon of the AFMTC.

Another task group consists of the USS Kittiwake (ARS-13), commanded by Lt. Cmdr. W. M. Scott, two helicopters of Marine Aircraft Group 26 from New River, North Carolina, and two AFMTC 65-foot launches.

The largest task group, responsible for the high probability landing area downrange, consists of a total of seven ships and 18 aircraft under the command of Captain Stanley M. Barnes, Commander Destroyer Squadron Four. Captain Barnes will fly his pennant in the USS Manley (DD-940), commanded by Cmdr. Kenneth C. Wallace. Other ships in the group are:

USS McCard (DD-822), commanded by Cmdr. Richard N. Moss

USS Power (DD-839), commanded by Cmdr. John H. Jorgenson

USS Vesole (DDR-878), commanded by Cmdr. Buford D. Abernathy

USS Hailey (DD-556), commanded by Cmdr. James W. Smith

USS Casa Grande (LSD-13), commanded by Cmdr. John B. Meehan. (The Casa Grande will have aboard three helicopters of Marine Aircraft Group 26.)

An Atlantic Missile Range telemetry ship.

The Air Recovery Element of the task group consists of eleven P2V aircraft of Patrol Squadron Sixteen, based at Jacksonville, Florida, commanded by Cmdr. Ralph F. Bishop, four aircraft of the Air Rescue Service based at Orlando, Florida, and three C-54 aircraft from the Air Force Missile Test Center.

All helicopters in the force are based at New River, North Carolina, as units of Marine Aircraft Group 26, which is commanded by Col. John R. Bohnet, USMC.

Other units which will play an important role in the recovery of the Mercury capsule are the Oceanographic System, Atlantic at Norfolk, Virginia, commanded by Captain Sigmund A. Bobczynski and the Guided Missile Operations Control Unit at Roosevelt Roads, Puerto Rico, commanded by Cmdr. William P. Robertson, Jr.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D. C.

Annex I, Item 5

Hold for Release
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Release No. 60-233

PROJECT MERCURY BACKGROUND

Project Mercury, the initial manned space flight program of the National Aeronautics and Space Administration, had its beginning in October of 1958. (In Roman mythology, Mercury is the winged messenger of the gods.)

A special management element of the Goddard Space Flight Center, the Space Task Group, exercises supervision and technical direction of Project Mercury. Space Task Group, headed by Project Mercury Director Robert R. Gilruth, is located at Langley Field, Virginia.

The purpose of Project Mercury is to investigate man's capabilities in the space environment. Immediate technical objectives include unmanned animal and manned suborbital ballistic flights, preparatory to earth-orbital flights at a mean altitude of about 120 statute miles.

The capsule has high aerodynamic drag, and is statically stable over the Mach number range corresponding to flight within the atmosphere. The capsule, a non-lifting type, is designed to withstand any known combination of acceleration, heat loads, and aerodynamic forces that might occur during boost or re-entry. It has an extremely blunt leading face covered with an ablative heat shield.

Recovery from an orbital flight on land or water will be possible.

A retro-rocket system is designed to provide sufficient impulse to permit atmospheric entry in less than one-half an orbital revolution after application in later orbital flights.

As in the case of new research aircraft, orbital flight of the manned space capsule will take place only after extensive tests of the vehicle. Project Mercury includes ground testing, development and qualification flight testing, and astronaut training.

The following rocket-boosted Mercury test flights of research and development capsules have provided a wealth of information:

Big Joe -- September 9, 1959 -- From the Atlantic Missile Range to test capsule heat shield, boosted by an Atlas.

Little Joe I -- October 4, 1959 -- From NASA's Wallops Station, Va., to test integration of booster and capsule airframe, boosted by a special vehicle consisting of eight solid rockets.

Little Joe II -- November 4, 1959 -- From Wallops Station to evaluate critical low-altitude abort conditions.

Little Joe III -- December 4, 1959 -- From Wallops Station to check performance of escape system at high altitude. Rhesus monkey Sam was aboard.

Little Joe IV -- January 21, 1960 -- From Wallops Station to check escape system under high air loads. Rhesus monkey Miss Sam was aboard.

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In addition, a production version of capsule underwent a test of the capsule escape system in a pad abort situation at Wallops Island May 9, 1959. Only the capsule escape rocket was used in this test.

In the months ahead, production capsules will be flown in various suborbital ballistic trajectories by Redstones and Atlases before some orbital Atlas-boosted missions are attempted.